

CLAIMS

1. A method for monitoring cells in a microfluidic device, wherein the device includes a chamber comprising a sensor, and the monitoring is under conditions such that attachment of cells to the surface of the chamber is inhibited.
- 5 2. A method according to claim 1, wherein the chamber surface comprises a gas-permeable material.
3. A method according to claim 2, wherein the gas is CO<sub>2</sub>, NH<sub>3</sub> or O<sub>2</sub>.
4. A method according to claim 2 or claim 3, wherein the material is a fluoropolymer.
- 10 5. A method according to any preceding claim, wherein the chamber surface comprises a hydrophilic material.
6. A method according to claim 5, the hydrophilic material is polyvinyl alcohol.
7. A method according to any preceding claim, wherein the chamber is  
15 formed in an epoxy resin coated on a plastics substrate.
8. A method according to claim 7, wherein the plastics material is polycarbonate.
9. A method according to any preceding claim, wherein the chamber comprises a plurality of sensors.
- 20 10. A method according to any preceding claim, wherein the sensor is sensitive to oxygen, carbon dioxide, ammonium ion or pH.
11. A method according to any preceding claim, wherein the sensor is an optical sensor.
12. A method according to claim 11, wherein the sensor is a holographic  
25 sensor.
13. A method according to any of claims 1 to 10, wherein the sensor is an electrochemical or acoustic sensor.
14. A method according to any preceding claim, wherein the sensor is sensitive to a reactant or product of fermentation.
- 30 15. A method according to any preceding claim, wherein the volume of the chamber is from 50 nL to 10 µL.

16. A method according to any preceding claim, which further comprises introducing growth medium into the chamber, wherein the sensor is sensitive to a reactant or product of cell growth.
17. A method according to claim 16, wherein the growth medium comprises  
5 a non-metabolisable mannose analogue.
18. A method according to claim 17, wherein the analogue is methyl  $\alpha$ -D-mannopyranoside.
19. A method according to any preceding claim, which further comprises introducing a component of or derived from the cells into a second microfluidic  
10 chamber comprising a sensor and in connection with the first chamber detecting said component.
20. A method according to claim 19, wherein the component is a product of cell growth.
21. A method according to claim 19, wherein the component is an expressed  
15 protein or enzyme.
22. A method according to any of claims 19 to 23, wherein the sensor of the second chamber is as defined in any of claims 10 to 15.
23. A microfluidic device suitable for use in a method according to any preceding claim, which comprises a chamber including a sensor and inlets for  
20 a sample and for a growth medium, wherein the chamber surface is such that, in use, attachment of cells thereto is inhibited.
24. A device according to claim 23, having any of the features defined in claims 2 to 15.
25. A device according to claim 23 or claim 24, which comprises a plurality of  
25 the chambers.
26. A device according to claim 25, wherein the chambers are in the form of an array.
27. A device according to claim 25 or claim 26, wherein a pair of chambers is connected by a channel.